

Residential Consumers Vulnerable to Higher Natural Gas Prices

August 20, 2021

In February 2021, a sudden drop in temperatures resulted in a dramatic increase in demand and decrease in the supply of natural gas as critical infrastructure went offline or was damaged. Although seen in many parts of the country, the effects were particularly acute in Texas. A consequence of these dramatic temperature shifts was a sudden increase in the spot price of natural gas, to an all-time high of \$23.86 per million British thermal unit or \$24.74 per thousand cubic feet (KCF), 728% higher than it was at the start of the month. (See **Figure 1**.)

While the price of natural gas has since come down, it is still higher than in 2019. Since January 2021, the price of natural gas has increased 42%, a significant deviation from the low natural gas prices over the past several years. The summer of 2021 has been on-average hotter than previous summers, compounded by heat waves that have increased the demand for electricity and consequently natural gas for electricity generation to a point where electrical grids struggled to meet the increased demand.

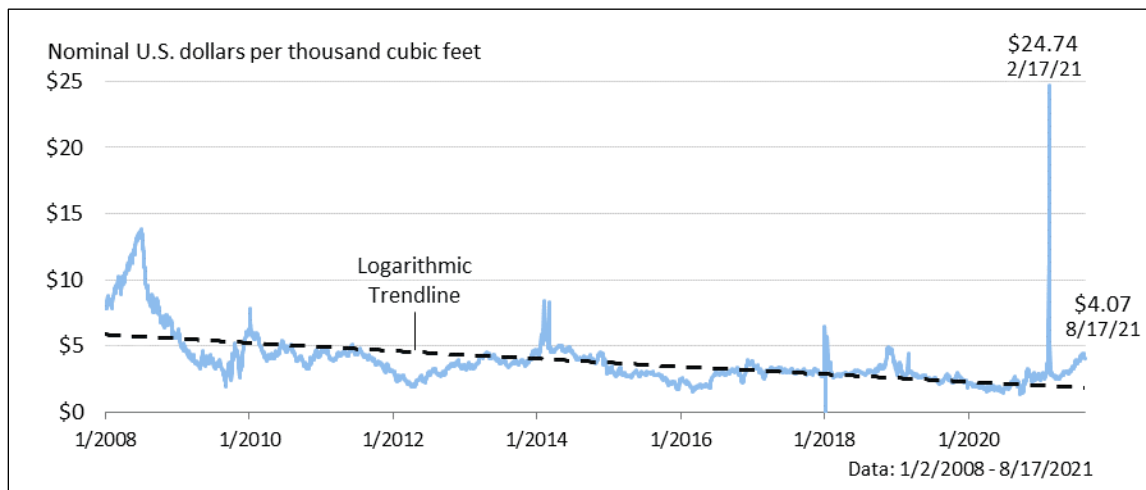
With lowered supply and increased demand, it is important to understand the impact of these shocks within the residential sector, a large consumer of natural gas. While until recently natural gas prices had steadily declined over the past decade (as discussed below), residential customers have not benefited as much as other sectors. With potentially more dramatic changes in climate, the residential sector will be particularly vulnerable to increased natural gas prices, especially while households recover from the economic stresses of the COVID-19 pandemic.

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Figure 1. Daily Spot Natural Gas Prices
2008-2021



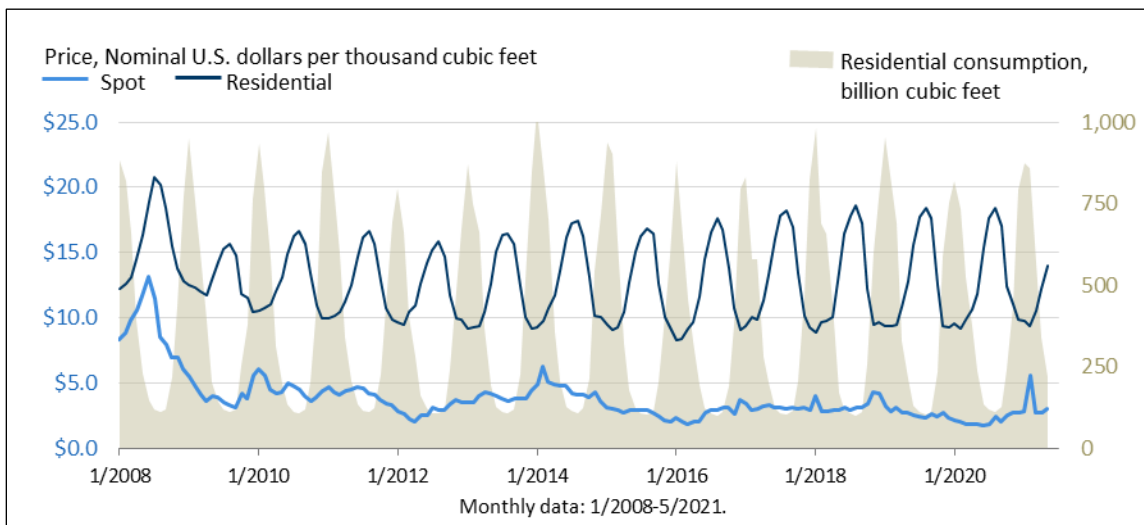
Source: U.S. Energy Information Administration (EIA), [Natural Gas Futures Prices \(NYMEX\)](#) ([eia.gov](#)).

Notes: NYMEX price data is given in dollars per million British thermal units, but for this graphic the price data were changed to dollars per thousand cubic feet to be consistent with other price data. The conversion factor is 1.037 million British thermal unit per thousand cubic feet.

For the last decade, the United States was the largest producer, the largest consumer, and the largest storage holder of natural gas, and contained the most comprehensive pipeline network. The United States is also one of the largest and fastest growing exporters of natural gas in the world. One of the benefits of shale gas development for the United States has been a drop in domestic natural gas prices, which on a [spot basis](#) have fallen [almost 77%](#) from \$9.19 KCF in 2008 to \$2.11 KCF in 2020. Low prices have been the impetus for increased use of natural gas in the U.S. energy mix, rising from 26% in 2008 to [34% in 2020](#). The largest share of U.S. [electricity generation](#) comes from natural gas, but it is also used significantly as a fuel source in homes and businesses, and as a feedstock in industrial processes and manufacturing.

The effect of lower [natural gas prices](#) has been felt across the U.S. economy, especially in the electrical and industrial sectors. Between 2008 and 2020, prices fell 73% and 66%, respectively, and [consumption](#) increased 74% and 24%, respectively. Industrial use is hampered by the relocation time necessary for business to move or open in the United States. While the effect of lower natural gas prices helped the aforementioned sectors, the effect on the price of natural gas for residential consumers has been less, falling 22% during the same time period, while consumption declined 5%. Although the drop in consumption is primarily because of the decrease in demand from the COVID-19 pandemic, consumption still rose less than 3% between 2008 and 2019. Between 2016 and 2021, the greatest differential between the NYMEX price and residential price was \$16.08 per thousand cubic feet, for August 2019 (see [Figure 2](#)).

Figure 2. Select Monthly Natural Gas Prices and Consumption
2008-2021



Source: EIA, [Natural Gas—U.S. Energy Information Administration \(EIA\)](#).

Notes: August is the peak month for natural gas prices for residential consumers.

The U.S. [residential sector](#) primarily uses natural gas for heating buildings, cooking, hot water, and drying clothes. In 2020, 15% of U.S. natural gas consumption was for residential uses. There are over [70 million residential consumers](#) of natural gas in the United States, with some regions, like the northeast, being very dependent on natural gas for winter residential heating and electricity generation. Despite there being more residential consumers, the amount of natural gas consumed by residential customers has not changed significantly since 1970. As of 2020, 42% of U.S. households use natural gas as an energy source, consuming [4,648 billion cubic feet \(BCF\)](#). Over the last five years, residential consumption has accounted for 17% of U.S. natural gas consumption.

Natural gas prices and consumption are seasonal, with prices rising in the spring and summer and consumption rising in the winter months. However, in some of the hottest regions of the United States there is a second peak during the summer as more natural gas is used for electricity generation for air conditioning.

Residential natural gas prices reached their highest point in 2008, averaging \$15.76/KCF. In 2020, residential prices averaged \$12.72/KCF, a 19% decline from 2008. Most of the cost of residential natural gas is connection costs, rather than commodity prices. The pipelines that deliver natural gas to homes are smaller and require more maintenance than their larger counterparts. Other costs include the process of odorizing natural gas so it can be detected in case of leaks, storing natural gas in periods of low demand in an effort to provide a physical hedge in periods of high demand, and mandated efficiency programs. From 2008 to 2020, the average monthly difference between the spot price of natural gas and the residential price was \$9.01/KCF.

The effects of the shale gas revolution did not have as much of an effect on the residential natural gas sector as it did on other sectors. The biggest change for future residential consumption may be in the potential switch to home electrification, thereby decreasing direct natural gas consumption.

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